IN THE DRAWINGS:

Please accept the enclosed five replacement sheets of Figs. 1-9, which have been revised in accordance with the examiner's requirements.

IN THE CLAIMS:

Claim 1 (currently amended): A method ~~Method~~ for producing substrates charged with materials, in which

a) at least one substrate is introduced into an evacuated vacuum container;

b) the surface of the substrate to be charged is exposed to a reactive gas which is adsorbed on the surface;

c) the exposure of the surface to the reactive gas is terminated,

d) the reactive gas adsorbed on the surface is allowed to react, ~~characterized in that~~ and wherein

d_1) the surface with the adsorbed reactive gas is exposed to a low-energy plasma discharge with ion energy E_{I0} on the surface of the substrate of

$$0 < E_{I0} \leq 20 \text{ eV}$$

and an electron energy E_{eo} of

$$0 \text{ eV} < E_{eo} \leq 100 \text{ eV}; \text{ and}$$

d_2) the adsorbed reactive gas is allowed to react at least with the cooperation of plasma-generated ions and electrons.

Claim 2 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the plasma discharge is realized with an ion energy E_{I0} on the surface of the substrate of

$$0 \text{ eV} < E_{I0} \leq 15 \text{ eV}.$$

Claim 3 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the adsorbed reactive gas is a reactive gas mixture.

Claim 4 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the plasma discharge is maintained in an inert gas atmosphere.

Claim 5 (currently amended): The method ~~Method~~ as claimed in claim 4, ~~characterized in that~~ wherein the plasma discharge is maintained in an argon atmosphere.

Claim 6 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the plasma discharge is generated in an atmosphere which contains a further reactive gas or gas mixture.

Claim 7 (currently amended): The method ~~Method~~ as claimed in claim 6, ~~characterized in that~~ wherein the further reactive gas or gas mixture contains at least one of the gases hydrogen, nitrogen, oxygen.

Claim 8 (currently amended): The method ~~Method~~ as claimed in claim 6, ~~characterized in that~~ wherein the further reactive gas or gas mixture comprises hydrogen ~~, preferably is hydrogen~~.

Claim 9 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the vacuum container is evacuated to a pressure (p_v) for which applies:

$$10^{-11} \text{ mbar} \leq p_v \leq 10^{-8} \text{ mbar}.$$

Claim 10 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the reactive gas to be adsorbed is allowed to flow in up to a partial pressure p_p, for which applies:

$$10^{-4} \text{ mbar} \leq p_p \leq 1 \text{ mbar}.$$

Claim 11 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the gas adsorption rate on the surface is controlled by heating/cooling the surface.

Claim 12 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the exposure is terminated ~~thereby that~~ and the substrate is transferred from the evacuated vacuum container into a further evacuated vacuum container.

Claim 13 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the exposure of the surface is terminated by pumping out the remaining adsorbed reactive gases from the evacuated vacuum container.

Claim 14 (currently amended): The method ~~Method~~ as claimed in claim 13, ~~characterized in that~~ wherein the reactive gas is pumped out until a pressure p_v' is reached for which applies:

$$10^{-11} \text{ mbar} \leq p_v' \leq 10^{-8} \text{ mbar}.$$

Claim 15 (canceled)

Claim 16 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein at least the steps b) to d_2) are completed at least twice.

Claim 17 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein after carrying out at least one step d_2), a different material is applied onto the surface.

Claim 18 (currently amended): The method ~~Method~~ as claimed in claim 17, ~~characterized in that~~ wherein the further material is applied by means of a vacuum coating process, by means of wet chemistry or galvanically.

Claim 19 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein before the exposure of the surface to the reactive gas to be adsorbed, the surface is exposed to a low-energy inert gas plasma, ~~preferably an argon plasma,~~ with ion energies E_{I1} on the surface of

$$0\ eV < E_{I1} \leq 20\ eV$$

~~preferably~~

$$\cancel{0\ eV < E_{I1} \leq 15\ eV}$$

and an electron energy E_{e1} of

$$0\ eV < E_{e1} \leq 100\ eV.$$

Claim 20 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein before the exposure of the surface to the reactive gas to be adsorbed, the surface is exposed to a low-energy plasma discharge in an atmosphere comprising a further reactive gas, where for the ion energy E_{I2} applies:

$$0\ eV < E_{I2} \leq 20\ eV,$$

~~preferably~~

$$\cancel{0\ eV < E_{I2} \leq 15\ eV}$$

at an electron energy E_{e2} of

$$0\ eV < E_{e2} \leq 100\ eV.$$

Claim 21 (currently amended): The method ~~Method~~ as claimed in claim 20, ~~characterized in that~~ wherein the further reactive gas is at least one of the gases hydrogen, nitrogen, oxygen.

Claim 22 (currently amended): The method ~~Method~~ as claimed in claim 20, ~~characterized in that~~ wherein the further reactive gas comprises hydrogen~~, preferably is hydrogen~~.

Claim 23 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein after the reaction of the adsorbed reactive gas, the surface is exposed to a low-energy inert gas plasma, ~~preferably argon plasma,~~ with an ion energy E_{I3} on the surface of

$$0 \text{ eV} < E_{I3} \leq 20 \text{ eV},$$

~~preferably~~

$$\cancel{0 \text{ eV} < E_{I3} \leq 15 \text{ eV}}$$

and an electron energy E_{e3} of

$$0 \text{ eV} < E_{e3} \leq 100 \text{ eV}.$$

Claim 24 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein after the reaction of the adsorbed reactive gas, the surface is exposed to a low-energy plasma discharge in an atmosphere which comprises a further reactive gas, wherein for the ion energy E_{I4} on the substrate surface applies:

$$0 \text{ eV} < E_{I4} \leq 20 \text{ eV},$$

~~preferably~~

$$\cancel{0 \text{ eV} < E_{I4} \leq 15 \text{ eV}}$$

and with an electron energy E_{e4} of

$$0 \text{ eV} < E_{e4} \leq 100 \text{ eV}.$$

Claim 25 (currently amended): The method ~~Method~~ as claimed in claim 24, ~~characterized in that~~ wherein the further reactive gas is at least one of the gases hydrogen, nitrogen, oxygen.

Claim 26 (currently amended): The method ~~Method~~ as claimed in claim 24, ~~characterized in that~~ wherein the further reactive gas comprises hydrogen~~, preferably is hydrogen~~.

Claim 27 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the surface charging takes place by means of at least one of the following materials:

oxides or nitrides or oxinitrides of Si, Ge, Ti, Ta, Hf, Zr, Al, Nb, W and/or of the following metals:

Al, Ti, Cu, W, Ta.

Claim 28 (currently amended): The method ~~Method~~ as claimed in claim 27, ~~characterized in that~~ wherein the surface charging takes place by means of at least one of the following materials:

silicon oxide, tantalum oxide, zirconium oxide, titanium nitride, tantalum nitride, tungsten nitride, $(TaSi)_xN_y$.

Claim 29 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein all method steps are carried out in one vacuum container.

Claim 30 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the method steps are carried out in at least two vacuum containers.

Claim 31 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the process atmosphere encompassing the surface of the substrate during at least one of the phases comprised of steps b) and c) and/or d) to d_2), is isolated from the inner wall of a vacuum container at ambient surroundings.

Claim 32 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the surface to be charged includes the surface of a substrate already charged or coated.

Claim 33 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the surface before the adsorption step and/or after the reaction of the adsorbed reactive gases or gas mixture is exposed to a plasma-enhanced cleaning step, in which in a reactive gas or gas mixture ~~- preferably comprising hydrogen - it~~ is activated by means of a low-energy plasma discharge with ion energy E_r on the substrate surface of

$$0 \text{ eV} < E_r \leq 20 \text{ eV},$$

at an electron energy E_{er} of

$$0 \text{ eV} < E_{er} \leq 100 \text{ eV}.$$

Claim 34 (currently amended): The method ~~Method~~ as claimed in claim 33, ~~characterized in that~~ wherein during the at least one cleaning step the cleaning process atmosphere is isolated by means of a metallic encapsulation from the inside wall of the cleaning vacuum container at ambient surrounding or this process atmosphere is directly ~~preferably~~ delimited by the inside wall of a cleaning vacuum container at ambient surroundings.

Claim 35 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein through a single sequence of steps a) to d_2) one atom monolayer is applied onto the surface.

Claim 36 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein by repeating steps b) to d) an epitaxial layer is grown on, with a change of the reactive gas heteroepitaxial ones, without a change of the reactive gas homoepitaxial ones.

Claim 37 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein after carrying out a ~~predetermined~~ fixed number of passes through steps b) to d) sequentially on several substrates the process volume of the vacuum container is subjected to a plasma-enhanced process volume cleaning step without an introduced substrate or with a substrate dummy, which process volume cleaning step ~~preferably~~ first comprises an etching step, subsequently a cleaning step, ~~preferably~~ in a plasma comprising hydrogen, inert gas or a mixture thereof.

Claim 38 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein before step a) and/or after step d_2) the substrate is subjected to a substrate cleaning step after being spatially separated from the vacuum container and that the transport of the substrate there between is carried out under vacuum.

Claim 39 (currently amended): The method ~~Method~~ as claimed in claim 38, ~~characterized in that~~ wherein the transport under vacuum takes place at least piecewise linearly or ~~preferably~~ along a circular path, with linear guide movements to said containers, ~~preferably~~ with motion components radial with respect to a circular path.

Claim 40 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein during steps b) to and including d) the process atmosphere to which is exposed the surface is isolated from the inner wall of a vacuum container at ambient surrounding by means of a surface which in the new condition is chemically inert against the reactive gas or gas mixture and/or against a second plasma-activated reactive gas or gas mixture, ~~preferably~~ by means of a dielectric or graphitic surface.

Claim 41 (currently amended): The method ~~Method~~ as claimed in claim 40, ~~characterized in that~~ wherein the inert surface is the surface of a partition wall which is spaced apart from the inner wall of the vacuum container along predominant surface sections.

Claim 42 (currently amended): The method ~~Method~~ as claimed in claim 40, ~~characterized in that~~ wherein the surface for isolation in the new condition is realized of at least one of the following materials:

quartz, graphite, silicon carbide, silicon nitride, aluminum oxide, titanium oxide, tantalum oxide, niobium oxide, zirconium oxide or a layered combination of these materials, in this case also with diamond-like carbon or diamond.

Claim 43 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the plasma discharge is realized with an electron source with electron energy $E_e \leq 50$ eV~~, in particular preferred by means of a DC discharge~~.

Claim 44 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein that the plasma discharge is realized by means of a thermionic cathode, ~~preferably~~ with a directly heated thermionic cathode.

Claim 45 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein in the process volume of the vacuum container for the plasma discharge at least two anodes spatially offset and ~~preferably~~ each heatable are provided, ~~preferably~~ each electrically actuatable separately and through the control of the electric potentials impressed thereon and/or their temperature the plasma density distribution along the surface is dynamically adjusted or controlled along the surface.

Claim 46 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein during step d) in the process volume a magnetic field is generated and by means of this magnetic field the plasma density distribution along the surface is stationarily and/or dynamically adjusted or controlled, ~~preferably~~ at least such that it wobbles locally.

Claim 47 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein at least the reactive gas or gas mixture to be adsorbed is allowed to flow distributively into the process atmosphere, ~~preferably~~ with a direction of inflow substantially parallel to the surface and, further ~~preferred~~, with injection sites equidistant from the surface.

Claim 48 (currently amended): The method ~~Method~~ as claimed in claim 1, ~~characterized in that~~ wherein the substrate is a silicon oxide-coated substrate with grooves sunk into the silicon oxide layer, and that after carrying out n-times one of the steps d_2), copper is deposited in the grooves, where $n \geq 1$.

Claim 49 (canceled)

Claim 50 (new): The method as claimed in claim 1, wherein before the exposure of the surface to the reactive gas to be adsorbed, the surface is exposed to a low-energy inert gas plasma, with ion energies E_{I1} on the surface of

$$0\ eV < E_{I1} \leq 15\ eV$$

and an electron energy E_{e1} of

$$0\ eV < E_{e1} \leq 100\ eV.$$

Claim 51 (new): The method as claimed in claim 1, wherein before the exposure of the surface to the reactive gas to be adsorbed, the surface is exposed to a low-energy plasma discharge in an atmosphere comprising a further reactive gas, where for the ion energy E_{I2} applies:

$$0\ eV < E_{I2} \leq 15\ eV$$

at an electron energy E_{e2} of

$$0\ eV < E_{e2} \leq 100\ eV.$$

Claim 52 (new): The method as claimed in claim 6, wherein the further reactive gas or gas mixture consists of hydrogen.

Claim 53 (new): The method as claimed in claim 1, wherein after the reaction of the adsorbed reactive gas, the surface is exposed to a low-energy inert gas plasma, preferably argon plasma, with an ion energy E_{I3} on the surface of

$$0\ eV < E_{I3} \leq 15\ eV$$

and an electron energy E_{e3} of

$$0\ eV < E_{e3} \leq 100\ eV.$$

Claim 54 (new): The method as claimed in claim 1, wherein the surface before the adsorption step and/or after the reaction of the adsorbed reactive gases or gas mixture is exposed to a plasma-enhanced cleaning step, in which in a reactive gas or gas mixture - comprising hydrogen - it is activated by means of a low-energy plasma discharge with ion energy E_r on the substrate surface of

$$0 \text{ eV} < E_r \leq 15 \text{ eV}$$

at an electron energy E_{er} of

$$0 \text{ eV} < E_{er} \leq 100 \text{ eV}.$$

Claim 55 (new): The method as claimed in claim 1, wherein after carrying out a selected number of passes through steps b) to d) sequentially on several substrates the process volume of the vacuum container is subjected to a plasma-enhanced process volume cleaning step without an introduced substrate or with a substrate dummy, and subsequently a cleaning step.

Claim 56 (new): The method as claimed in claim 1, wherein the plasma discharge is realized with an electron source with electron energy $E_e \leq 50$ eV, by means of a DC discharge.

Claim 57 (new): The method as claimed in claim 1, wherein that the plasma discharge is realized by means of a thermionic cathode.

Claim 58 (new): The method as claimed in claim 1, wherein in the process volume of the vacuum container for the plasma discharge, at least two anodes that are spatially offset from each other, are provided.

Claim 59 (new): The method as claimed in claim 1, wherein at least the reactive gas or gas mixture to be adsorbed is allowed to flow distributively into the process atmosphere.